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GB 2305954 A GB 2299602 A GB 2249119 A
GB 2238815 A GB 1249914 A

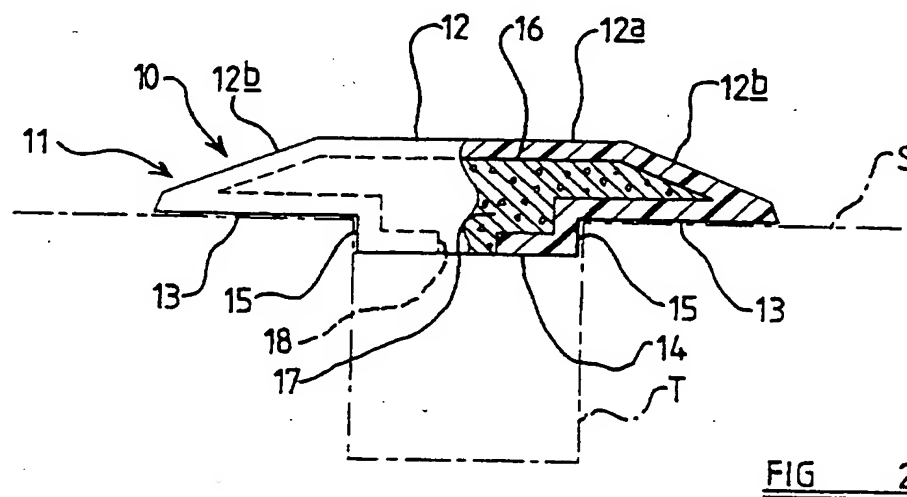
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INT CL⁶ E01C 9/08, E02D 17/10 29/14, E03F 5/06
WPI

(54) Abstract Title

Temporary covers for trenches and other excavations

(57) A temporary cover (10,20) for bridging trenches or other excavations comprises a hollow shell of plastics material shaped so as to afford a bridging portion (11) having an upper face (12) which is preferably of generally convex configuration, and locating means comprising a downwardly protruding portion (14) at the underside of the bridging portion (11) to define outwardly presented lateral abutment faces (15) spaced apart by a width corresponding to that of the bench. The hollow shell may be filled with any suitable material, such as foamed plastics material, light-weight foamed concrete, sand or water. Opposite ends of the cover (20) may be formed with means for establishing an articulated connection between adjacent covers along the line of a trench, preferably comprising a part-circular tongue (30) Fig 3 and a part-circular recess (40).



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1995

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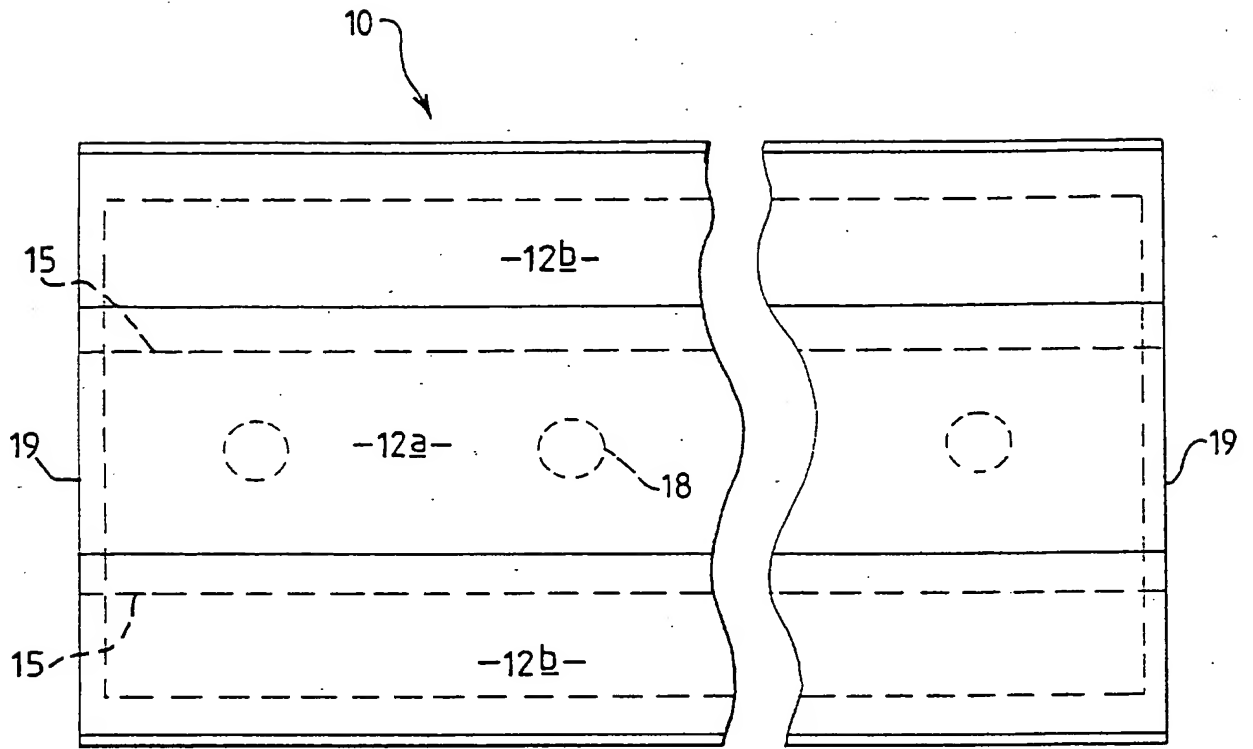


FIG 1

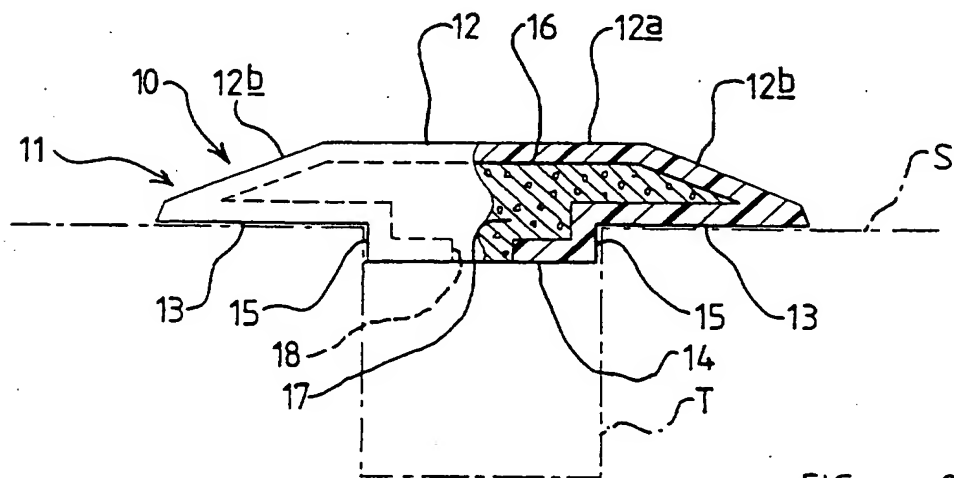


FIG 2

PATENTS ACT 1977

GDH/PJ/A9065GB

Title: "Temporary covers for trenches and other excavations"

Description of Invention

This invention relates to temporary covers for trenches or other similar excavations particularly on public highways and associated footpaths or pedestrian areas. The invention has been developed primarily to provide temporary bridging for trenches that may be formed, for example, for the purpose of laying pipes or cables, especially, but not exclusively, in connection with cable television, telephones and other communications systems.

Customarily, such trenches are formed by means of an excavator with an appropriately dimensioned bucket and, after the pipes or cables have been laid, the trench is filled, either with the excavated material or foamed concrete or other suitable material, and finished by the application of a layer of macadam or slabs as appropriate.

It is normally desirable to provide temporary bridging over at least selected parts of such trenches, for example to enable pedestrians or vehicles to cross safely. Conventionally, this has been achieved by the use of steel plates which are simply laid across the trench and retained in position by virtue of their substantial weight. However, the use of steel plates has a number of disadvantages. In particular their weight makes them difficult to handle and they may easily damage paving slabs or macadamised surfaces onto which they are dropped when being placed in position across a trench.

These considerations apply not only in the bridging of elongated excavations in the form of trenches, but also localised holes that may be formed to gain access to service pipes or cables in order to effect repair at specific locations.

According to the invention we provide a temporary cover for bridging trenches or other excavations and comprising a hollow shell of plastics material shaped so as to afford a bridging portion with locating means at the underside thereof adapted to enter into a trench or other excavation so as to resist lateral displacement of the bridging portion when in place, the interior of the hollow shell being filled with suitable material.

It will be appreciated that such a temporary cover may be formed in a range of sizes corresponding to specific widths of trench that are commonly employed, and specifically corresponding to the widths of excavator buckets, or other excavating machines as used in trenching operations. The bridging portion will then have a width which substantially exceeds the width of the trench with which it is intended to be used, and the locating means will be so dimensioned as to engage the side walls of the trench.

Since such covers are manufactured from plastic, they are much lighter than the steel plates currently used and can in most cases easily be handled by one person.

They can be manufactured in a range of widths and lengths and can be appropriately reinforced, where necessary, to give the required strength in accordance with anticipated loading conditions. Such reinforcement may take the form of internal or external ribs and/or internal reinforcement in the form of metal rods, grids or the like.

Conveniently, the bridging portion is formed with a generally convex surface at the upper side, and is generally flat at the underside, apart from the provision of the locating means, which may comprise a downwardly protruding portion of the cover at the underside thereof.

Such downwardly protruding portion may define respective laterally presented abutment faces at the opposed edges thereof, spaced apart by a distance corresponding to the width of the trench with which the cover is intended to be used. Alternatively, in some cases, the downwardly protruding portion may comprise two ribs each affording a respective laterally presented abutment face spaced apart from each other by the appropriate distance.

The material filling the hollow interior may be a foamed plastics material, concrete, particularly light-weight foamed concrete, a particulate solid, such as sand, or a liquid such as water.

According to the invention we also provide a temporary cover for bridging trenches or other excavations and comprising a hollow shell of plastics material shaped so as to afford a bridging portion with locating means at the

underside thereof adapted to enter into a trench or other excavation so as to resist lateral displacement of the bridging portion when in place, the shell having a closable filling aperture whereby the interior of the hollow shell may be filled with suitable liquid or particulate solid.

As mentioned previously, such covers may be made in various lengths and widths, but in accordance with a particularly preferred feature of the invention, the cover is formed with connecting means at opposite ends thereof to enable an articulated connection to be established between longitudinally adjacent covers, thereby enabling the covers to be used to construct a continuous bridging member capable of use on curved sections of trenches as well as on straight sections.

The invention further resides in a temporary cover for bridging trenches or like excavations and comprising a generally rectangular body shaped so as to afford a bridging portion with locating means at the underside thereof adapted to enter into a trench or other excavation so as to resist lateral displacement of the bridging portion when in place wherein the cover is formed with connecting means at opposite ends thereof to enable an articulated connection to be established between longitudinally adjacent covers, thereby enabling the covers to be used to construct a continuous bridging member capable of use on curved sections of trenches as well as on straight sections.

Most conveniently, said connecting means comprises a tongue which projects end-wise at one end of the cover and defines a part-circular bearing face between shoulders formed by end faces of the cover adjacent thereto, and a corresponding part-circular recess formed at the other end of the cover and defining a complementary part-circular bearing face between shoulders formed by end faces of the cover at the other end.

Preferably, the part-circular bearing faces afforded by the tongue and the recess each subtend an angle of substantially greater than 180° , preferably approximating to 280° - 290° , in the case of the tongue and about 250° - 260° in the case of the recesses, so that the recess is of undercut form and the tongue is held captive therein against endwise withdrawal, whilst being capable of withdrawal in a direction perpendicular to the bridging portion.

These and other features of the present invention will now be described by way of example with reference to the accompanying drawings, wherein:

FIGURE 1 is a plan view of one embodiment of elongated cover in accordance with the invention;

FIGURE 2 is a partially sectioned end view thereof;

FIGURE 3 is a plan view of a second embodiment of elongated cover formed with articulated connecting means in accordance with the invention;

FIGURE 4 is a transverse section on the line IV-IV of Figure 3;

FIGURES 5A and 5B are respectively end views in the direction of arrows A and B of Figure 3; and

FIGURE 6 is a plan view of three such articulated cover members in assembled relation over a curved section of trench.

The embodiment of cover as shown in Figures 1 and 2 is of simple rectangular form in plan view, and may be of any appropriate length. The cover 10 shown therein is formed as a hollow moulding of any suitable plastics material defining a bridging portion 11 having an upper face 12 of generally convex configuration, in the illustrated embodiment comprising a central flat face 12a and inclined lateral faces 12b. At its underside, the bridging portion 11 includes a pair of laterally spaced supporting faces 13 which are adapted to rest on the surface (S) of the ground on either side of a trench (T) covered thereby, and centrally the cover 10 is formed with a downwardly protruding portion 14 which affords outwardly presented lateral abutment faces 15 spaced apart by a width corresponding to that of the trench (T) with which the cover 10 is intended to be used, so as to engage the side walls of the trench and resist lateral displacement of the cover 10 when in use. It will be understood that the spacing between the lateral abutment faces 15 need not be such as to afford a close fit between the walls of the trench, and a substantial tolerance may be allowed.

In an alternative arrangement, the lateral abutment faces 15 may be afforded by spaced parallel hollow or solid downwardly producing ribs formed at the underside of the cover 10.

To provide additional rigidity, the hollow interior 16 of the cover 10 is

in the illustrated embodiment filled with a light-weight foamed plastics material 17 which may be introduced thereto through one or more apertures 18 formed in the underside of the portion 14. However, other materials may be used to fill the hollow cover, such as lightweight foamed concrete or particulate material such as sand, or as hereinafter described in relation to the second embodiment a liquid such as water.

The supporting faces 13 may, if desired, be formed with transversely or longitudinally extending ridges or other suitable gripping formations to provide resistance to longitudinal or lateral movement of the cover 10 when resting on the surface (S), but it will be appreciated that resistance to lateral movement is predominantly provided by engagement of the lateral abutment faces 15 of the portion 14 with the side walls of the trench (T) adjacent to the surface (S) on which the faces 13 rest.

The interior of the hollow cover 10 may, if required, be divided into longitudinally separate compartments by means of transverse ribs, similar to the end walls 19, in order to provide additional strength. Additionally, or alternatively, metallic or non-metallic reinforcement members may be incorporated in the cover 10.

The second embodiment of cover 20 as illustrated in Figures 3 to 6 is constructed in a generally similar manner to the cover 10, and like reference numerals are used to designate like parts. However, the cover 20 illustrated in Figures 3 to 5 is adapted to be filled with water, and additionally is formed with means providing for an articulated connection between longitudinally adjacent covers.

To enable the interior of the cover 20 to be filled, in use, with water, a single filling aperture 28 is formed at the underside of the downwardly protruding portion 14 to receive an externally threaded collar 27 with a tapered bung 29 by means of which the interior of the cover 20 may be closed subsequent to its being filled with water. It will be understood that where the interior of the cover is divided into separate compartments, a respective filling aperture 28 and associated collar 27 and bung 29 will be provided for each compartment.

Such an arrangement has the advantage that the covers can be filled with water at the site of usage, and drained after use, so as to reduce the weight of the covers during transportation and storage.

Whilst it is preferred to provide a collar 27 within the filling aperture 28, in some cases it may be possible to utilise a bung or stopper that fits directly into the filling aperture. Also, whilst the filling aperture is preferably formed at the underside of the cover, it may in some cases be provided at the upper side.

It will be understood that it would alternatively be possible to fill the cover 20 with a particulate material, such as sand, through the aperture 28 instead of water.

In order to establish an articulated connection, at one end the cover 20 is formed with an end-wise extension in the form of a tongue 30 which maintains the cross-sectional profile of the cover 20, but is of part-circular form so as to afford an outwardly directed part-circular bearing face 31, which subtends an angle (β) of substantially in excess of 180° , typically about 285° so as to form a neck 32 at the junction of the tongue 30 with the end face of the cover 20, and the end face is thereby divided into two shoulders 33 which extend away from the tongue at an angle (α) relative to a line transverse to the centreline of the cover 20.

At the other end, the cover 20 is formed with a corresponding part-circular recess 40 which affords an internal part-circular bearing face 41 which subtends an angle (γ) less than that of the locating face 31, typically about 255° and an open mouth 42 having a width less than the diameter of the recess 40, but greater than the width of the neck 32. The opposite end face of the cover 20 outwardly of the mouth 42 of the recess 40 likewise forms shoulders 43 extending at an angle (α) opposite to the angle (α) of the shoulders 32.

The arrangement is such that a series of covers 20 may be secured together in endwise relation by dropping the tongue 30 of one cover 20 into the corresponding recess 40 of an adjacent cover 20 as shown in Figure 5. The shape and size of the tongue 30 and the corresponding recess 40 prevents the adjacent covers 20 being separated in a longitudinal direction, and the angled arrangement of the shoulders 32 and 43 enables the adjacent covers 20 to be arranged with the

longitudinal centrelines at an angle, so as to allow such covers to follow the line of a curved section of trench.

Whilst the covers as described above are of generally elongated form and intended primarily for use in providing temporary bridging over elongated trenches, it will be understood that appropriately shaped and dimensioned covers of similar construction may be used to cover localised square or rectangular holes in a similar manner. For example, it would be possible to cover a rectangular hole using a pair of end cover members and one or more intermediate cover members, each of rectangular form, but with the end cover members having inclined lateral faces (similar to the inclined faces 12b of the first embodiment) along one of its longer edges and both of its shorter edges, and with the intermediate cover members having such inclined lateral faces at only their shorter edges, so that in combination such cover members define a flat, rectangular central area with inclined faces around its periphery. At their undersides, the end cover members and intermediate cover members would then be formed with respective downwardly protruding portions to define outwardly presented lateral abutment faces so located as to be engageable with the sides of the rectangular hole.

Not only does the use of such covers have the advantages of ease and lack of damage to the surface adjacent to the trench or hole, but additionally, using such covers it may be possible in some cases to eliminate the customary requirement for temporary barriers alongside or around the excavation. Indeed, the use of such covers may be an economical and preferable alternative to the use of such barriers even where it would not normally be required to bridge the excavation to enable vehicles or pedestrians to cross.

CLAIMS:-

1. A temporary cover for bridging trenches or other excavations and comprising a hollow shell of plastics material shaped so as to afford a bridging portion with locating means at the underside thereof adapted to enter into a trench or other excavation so as to resist lateral displacement of the bridging portion when in place, the interior of the hollow shell being filled with suitable material.
2. A temporary cover according to Claim 1 wherein the bridging portion is formed with a generally convex surface at the upper side, and is generally flat at the underside, apart from the provision of the locating means.
3. A temporary cover according to Claim 2 wherein the locating means comprise a downwardly protruding portion of the cover at the underside thereof.
4. A temporary cover according to Claim 3 wherein said downwardly protruding portion defines respective laterally presented abutment faces at the opposed edges thereof, spaced apart by a distance corresponding to the width of the trench with which the cover is intended to be used.
5. A temporary cover according to Claim 3 wherein said downwardly protruding portion comprises two ribs each affording a respective laterally presented abutment face spaced apart from each other by the appropriate distance.
6. A temporary cover according to any one of the preceding claims wherein the material filling the hollow interior is a foamed plastics material.
7. A temporary cover according to any one of Claims 1 to 6 wherein the material filling the hollow interior is concrete.
8. A temporary cover according to Claim 7 wherein the material is a light-

weight foamed concrete.

9. A temporary cover according to any one of Claims 1 to 6 wherein the material filling the hollow interior is a particulate solid.
10. A temporary cover according to Claim 9 wherein said particulate solid is sand.
11. A temporary cover according to any one of Claims 1 to 6 wherein the material filling the hollow interior is a liquid.
12. A temporary cover according to Claim 11 wherein said liquid is water.
13. A temporary cover for bridging trenches or other excavations and comprising a hollow shell of plastics material shaped so as to afford a bridging portion with locating means at the underside thereof adapted to enter into a trench or other excavation so as to resist lateral displacement of the bridging portion when in place, the shell having a closable filling aperture whereby the interior of the hollow shell maybe filled with suitable liquid or particulate solid.
14. A temporary cover according to any one of the preceding claims wherein the cover is formed with connecting means at opposite ends thereof to enable an articulated connection to be established between longitudinally adjacent covers, thereby enabling the covers to be used to construct a continuous bridging member capable of use on curved sections of trenches as well as on straight sections.
15. A temporary cover for bridging trenches or like excavations and comprising a generally rectangular body shaped so as to afford a bridging portion with locating means at the underside thereof adapted to enter into a trench or other excavation so as to resist lateral displacement of the bridging portion when in place

wherein the cover is formed with connecting means at opposite ends thereof to enable an articulated connection to be established between longitudinally adjacent covers, thereby enabling the covers to be used to construct a continuous bridging member capable of use on curved sections of trenches as well as on straight sections.

16. A temporary cover according to Claim 14 or Claim 15 wherein said connecting means comprises a tongue which projects end-wise at one end of the cover and defines a part-circular bearing face between shoulders formed by end faces of the cover adjacent thereto, and a corresponding part-circular recess formed at the other end of the cover and defining a complementary part-circular bearing face between shoulders formed by end faces of the cover at the other end.

A temporary cover according to any one of the preceding claims wherein the cover is formed with connecting means at opposite ends thereof to enable an articulated connection to be established between longitudinally adjacent covers, thereby enabling the covers to be used to construct a continuous bridging member capable of use on curved sections of trenches as well as on straight sections.

17. A temporary cover according to Claim 16 wherein the part-circular bearing faces afforded by the tongue and the recess each subtend an angle of substantially greater than 180° , so that the recess is of undercut form and the tongue is held captive therein against endwise withdrawal, whilst being capable of withdrawal in a direction perpendicular to the bridging portion.

18. A temporary cover according to Claim 17 wherein the part-circular bearing face afforded by the tongue subtends an angle in the range 280° to 290° .

19. A temporary cover according to Claim 16 wherein the part-circular bearing face afforded by the recess subtends an angle in the range 250° to 260° .

20. A temporary cover substantially as hereinbefore described with

reference to and as shown in Figure 1 and 2 of the accompanying drawings.

21. A temporary cover substantially as hereinbefore described with reference to and as shown in Figures 3 to 6 of the accompanying drawings.



Application No: GB 9800644.8
Claims searched: 1-14 and 16-21

Examiner: R L Williams
Date of search: 18 May 1998

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.P): E1G

Int Cl (Ed.6): E01C 9/08 E02D 29/14,17/10 E03F 5/06

Other: WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2,305,954 A British Gas plc	1-13
X	GB 2,299,602 A British Gas plc	1-13
X	GB 2,249,119 A Bicc Public Limited Company	1-13
X	GB 2,238,815 A British Gas plc	1-13
X	GB 1,249,914 O Burgess	1-13

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

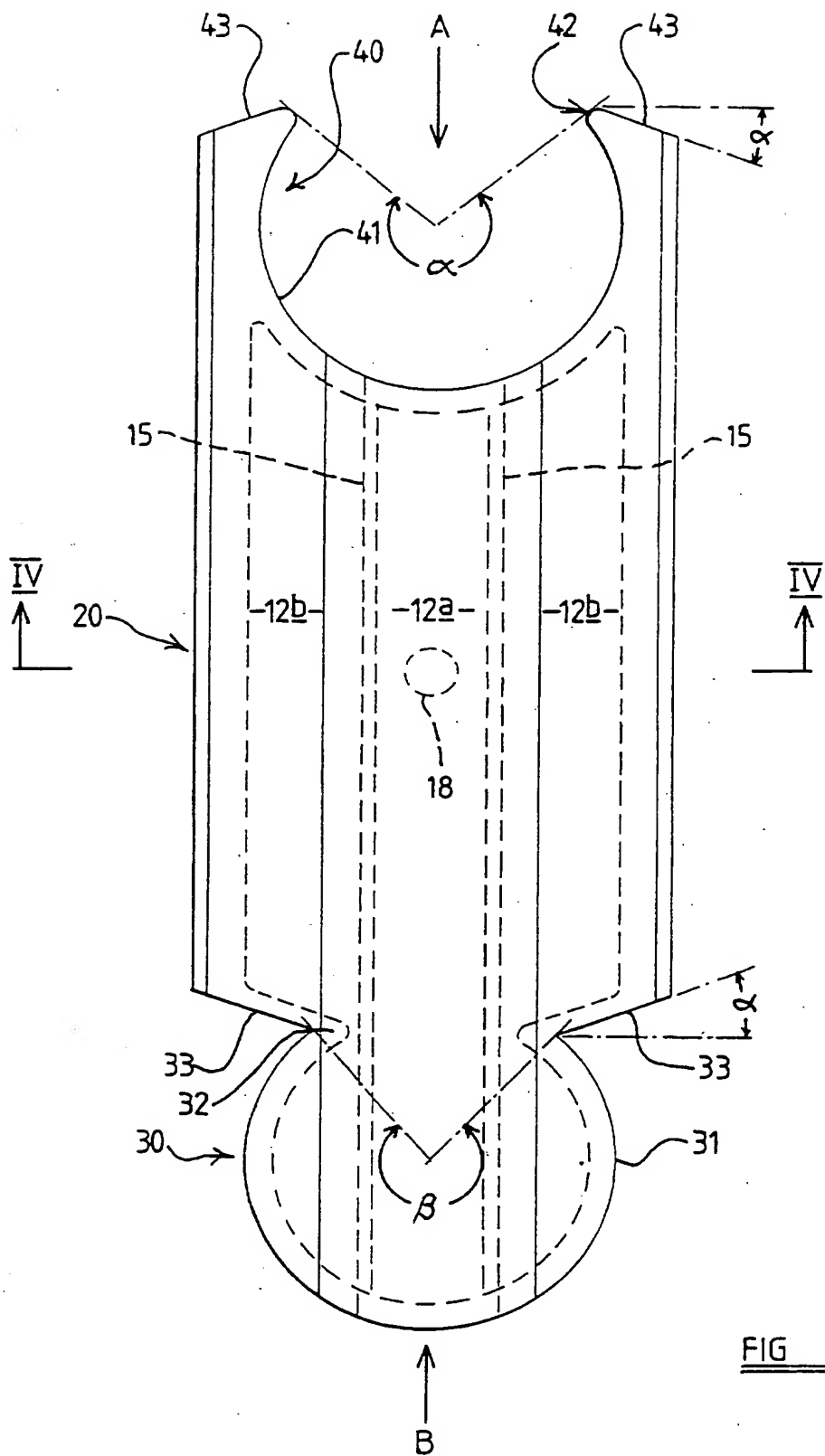


FIG 3

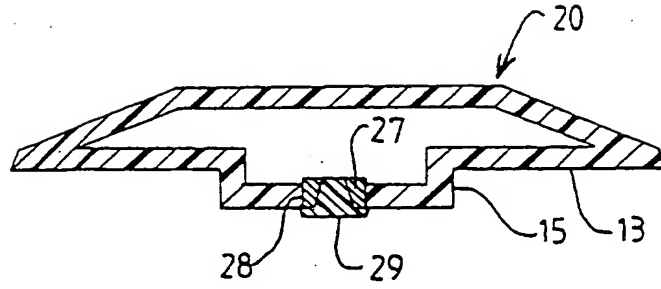


FIG 4

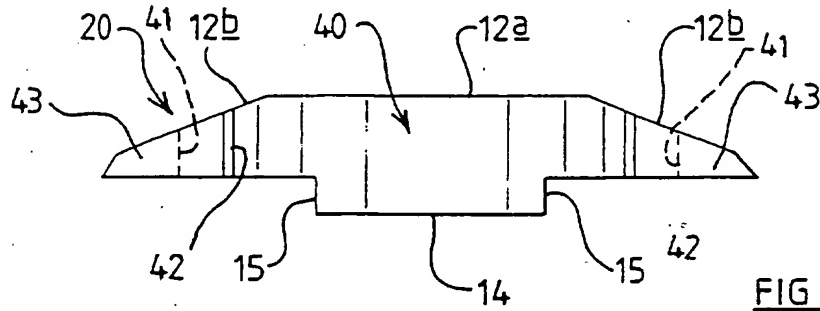


FIG 5A

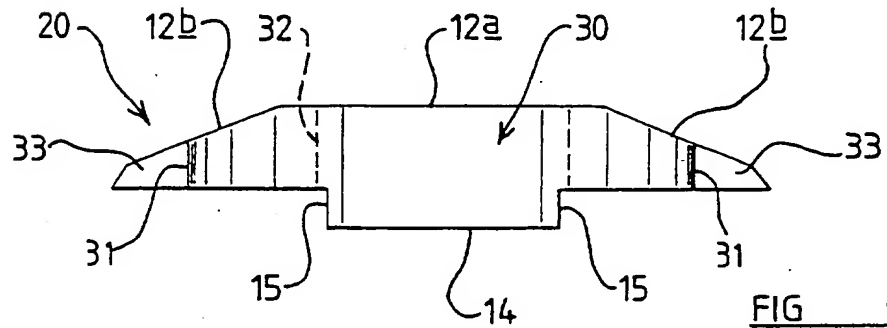


FIG 5B

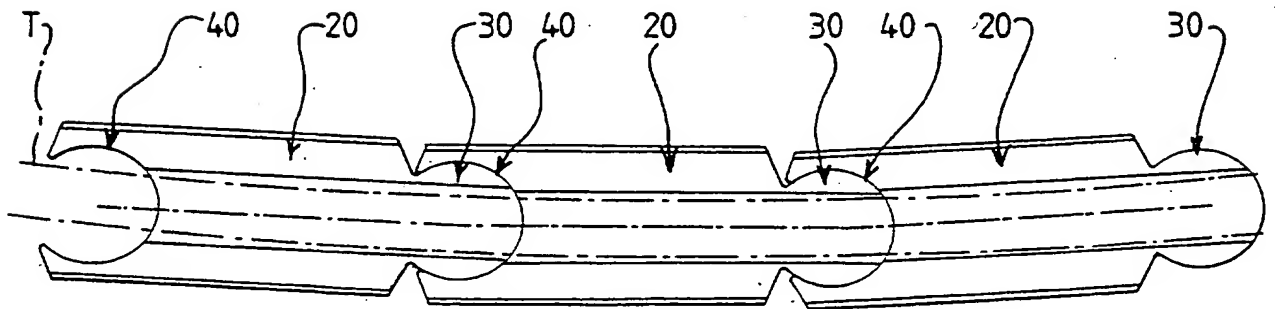


FIG 6